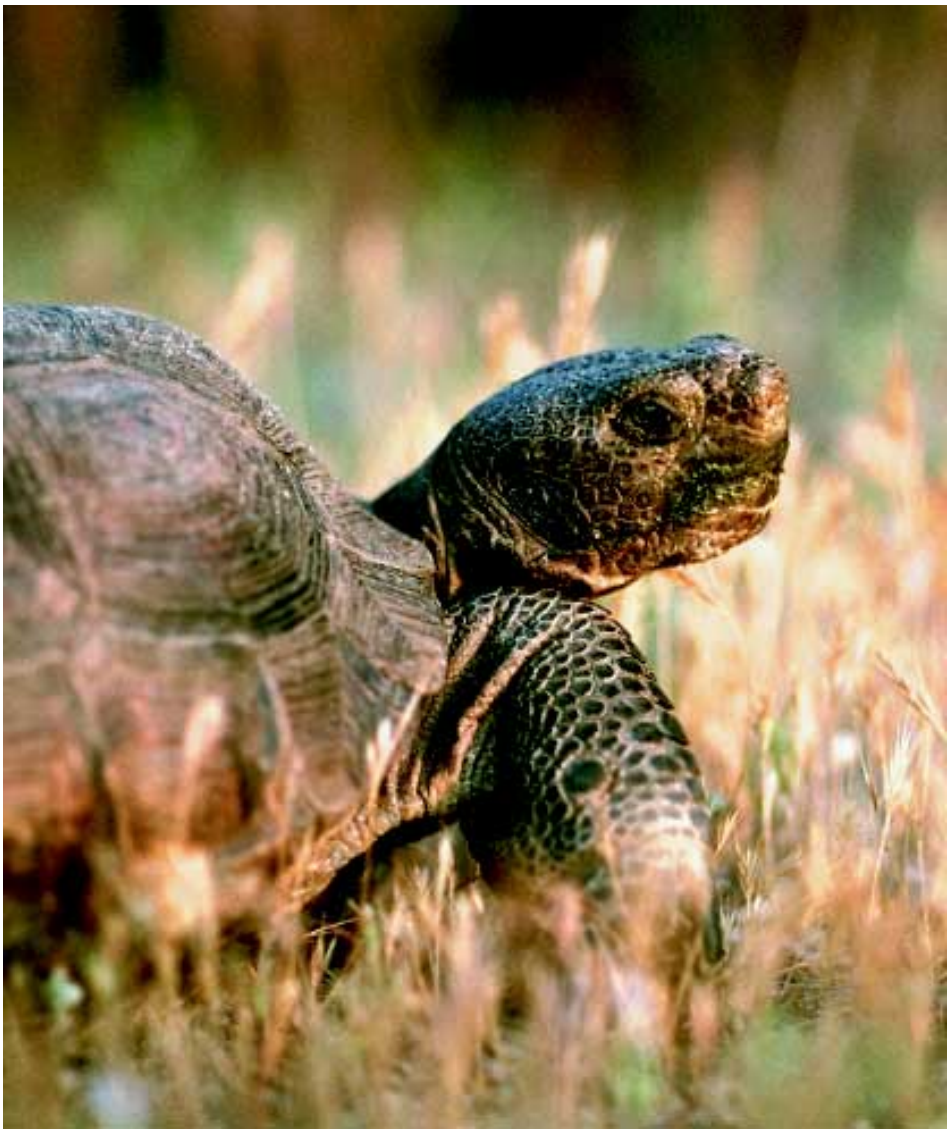
U.S. Fish & Wildlife Service

ENDANGERED Species BULLETIN

July/August 2000 Vol. XXV No. 4



No government agency working alone can ensure the survival of the wildlife resources we all share. The cooperation of private land owners and a wide variety of other interests is essential if we are to conserve our nation's animal and plant species for the future. Yet when people examine the effects of their activities on the environment, they sometimes face what they see as a choice between conservation and the legitimate use of their land. Congress addressed that issue in 1982 when it amended the Endangered Species Act to authorize Habitat Conservation Plans. When carefully implemented, these plans allow resource managers and property owners to carry out their lawful activities while becoming partners in maintaining wildlife habitat.

U.S. Fish & Wildlife Service

Photo by Larry Jones/U.S. Forest Service

WASHINGTON D.C. OFFICE *Washington, D.C. 20240*

Jamie Rappaport Clark, *Director*		
Gary Frazer, *Assistant Director for Endangered Species*		
	Nancy Gloman, *Chief, Office of Conservation & Classification*	*(703)358-2171*
	Martin Miller, *Acting Chief, Office of Consultation, HCPs, and Recovery*	*(703)358-2171*
	Kathi Bangert, *Chief, Office of Information Management*	*(703)358-2390*
	Kathy Walker, *Chief, Office of Program Support*	*(703)358-2079*

REGION ONE *Eastside Federal Complex, 911 N.E. 11th Ave, Portland OR 97232*

California, Hawaii, Idaho, Nevada, Oregon, Washington, American Samoa, Commonwealth of the Northern Mariana Islands, Guam and the Pacific Trust Territories	Anne Badgley, *Regional Director*	*(503)231-6118* http://pacific.fws.gov/

REGION TWO *P.O. Box 1306, Albuquerque, NM 87103*

Arizona, New Mexico, Oklahoma, and Texas	Nancy Kaufman, *Regional Director*	*(505)248-6282* http://southwest.fws.gov/

REGION THREE *Federal Bldg., Ft. Snelling, Twin Cities MN 55111*

Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin	William Hartwig, *Regional Director*	*(612)715-5301* http://midwest.fws.gov/

REGION FOUR *1875 Century Blvd., Suite 200, Atlanta, GA 30345*

Alabama, Arkansas, Louisiana, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Florida, Tennessee, Puerto Rico, and the U.S. Virgin Islands	Sam Hamilton, *Regional Director*	*(404)679-7086* http://southeast.fws.gov/

REGION FIVE *300 Westgate Center Drive, Hadley, MA 01035*

Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia	Mamie Parker, *Acting Regional Director*	*(413)253-8300* http://northeast.fws.gov/

REGION SIX *P.O. Box 25486, Denver Federal Center, Denver CO 80225*

Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming	Ralph O. Morgenweck, *Regional Director*	*(303)236-7920* http://www.r6.fws.gov/

REGION SEVEN *1011 E. Tudor Rd., Anchorage, AK 99503*

Alaska	Dave Allen, *Regional Director*	*(907)786-3542* http://alaska.fws.gov/

ENDANGERED Species BULLETIN

Telephone: (703)358-2390
Fax: (703)358-1735
Internet:
http://endangered.fws.gov

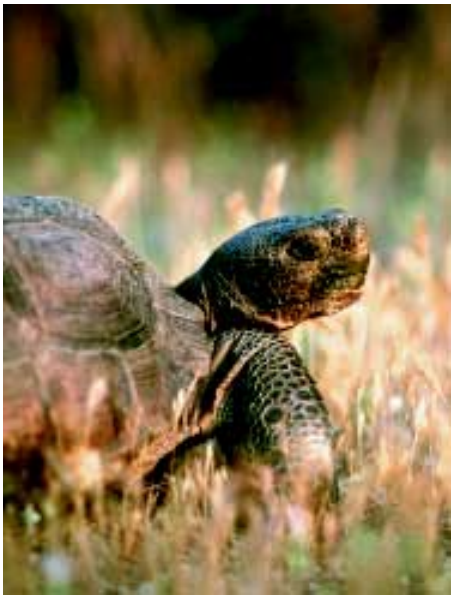
Editor
Michael Bender

Associate Editor
Martha Balis-Larsen

Editorial assistance provided by
Susan D. Jewell

Art Director
David Yeargin

Contributors
Marj Nelson
Shawnetta Grandberry
Lori Pruitt
Lisa Mandell
Luela P. Roberts
Ted Owens
Craig Hansen
William Vogel
Lorin Hicks
LaRee Brosseau
Bill Brooks
Mark W. Clough



On the Cover
Important habitat for the Mojave population of the desert tortoise is the focus of a Habitat Conservation Plan in southwestern Utah.
Corel Corp. photo

Opposite page:
Van Dyke's salamander *(Plethodon vandykei)*, a species of concern protected by Habitat Conservation Plans in the Pacific Northwest

The Endangered Species Bulletin welcomes manuscripts on a wide range of topics related to endangered species. We are particularly interested in news about recovery, habitat conservation plans, and cooperative ventures. Please contact the Editor before preparing a manuscript. We cannot guarantee publication.

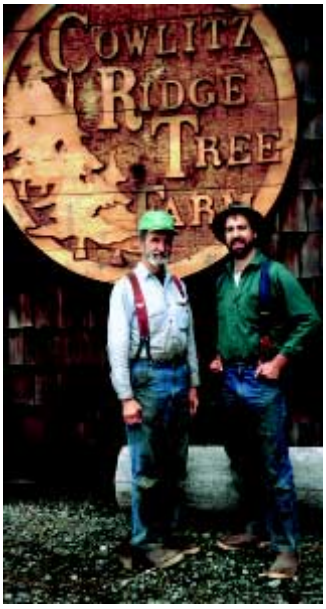
The Fish and Wildlife Service distributes the Bulletin primarily to Federal and State agencies, and official contacts of the Endangered Species Program. It also is reprinted by the University of Michigan as part of its own publication, the Endangered Species UPDATE. To subscribe, write the Endangered Species UPDATE, School of Natural Resources, University of Michigan, Ann Arbor, MI 48109-1115; or call (734) 763-3243.

Printed with vegetable-based ink on recycled and recyclable paper. If you do not keep back issues, please recycle the paper, pass them along to an interested person, or donate them to a local school or library.

IN THIS ISSUE

The Changing Face of HCPs

by Marj Nelson



Steve Stinson, right, pictured with his father Doug at their family's Cowlitz Ridge Tree Farm, is spearheading the development of an innovative HCP for Lewis County, Washington. This HCP will utilize adaptive management strategies to allow for continued timber harvest and other economic activity while conserving habitat for a variety of species, including the threatened northern spotted owl, pictured on opposite page.
Photo by Fae Marie Beck

Section 10 of the Endangered Species Act (ESA), as originally enacted in 1973, authorized permits for the taking of listed species by non-federal entities only under very limited circumstances.[1] These permitting provisions were not flexible enough to address situations in which a private landowner's otherwise lawful activities might result in limited incidental take of listed species, even if the landowner was willing to plan activities carefully to be consistent with the conservation of the species. As a result, Congress amended the ESA in 1982 to authorize the issuance of permits for incidental take of listed species in accordance with an approved Habitat Conservation Plan (HCP). By minimizing and mitigating the impact of the permitted incidental take, HCPs contribute to the long-term conservation of both listed and unlisted species.

As an incentive for non-federal property owners to make use of the HCP approach, the Fish and Wildlife Service and National Marine Fisheries Service developed the "No Surprises" policy to give economic and regulatory assurances on the overall cost of species conservation and mitigation. This policy states that an incidental take permittee will not be required to provide additional mitigation in the future beyond what was agreed to in the HCP, provided that the affected species were adequately covered and the permittee was properly implementing the HCP. The Services codified the No Surprises policy as a final rule in the February 23, 1998, *Federal Register*.

[1]"Take" is defined in the Endangered Species Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

Adaptive Management

In the June 12, 2000, *Federal Register*, the Services amended the HCP Handbook, both to reflect the No Surprises rule and to further enhance the HCP process through improvements in five areas: permit duration, public participation, monitoring provisions, establishment of clear biological goals, and adaptive management. As it is used here, the term "adaptive management" refers to an integrated method for addressing uncertainty in natural resource management (Holling 1978, Walters 1986, Gundersen 1999). It was adopted for natural resource conservation by Holling (1978), who described adaptive management as an interactive process that not only reduces, but benefits from, uncertainty. It may also be described simply as a structured process for learning by doing. A structured examination of alternative management strategies helps to address the potential uncertainties in achieving biological goals of an HCP.

At first glance, the concept of No Surprises assurances for permittees might seem to be at odds with the flexibility gained from incorporating alternative measures and adaptive management into HCPs. However, the No Surprises final rule solidifies the use of contingency planning in HCPs. The potential for "changed circumstances," a term formally defined in the No Surprises final rule, is considered during the development of HCPs. In addition, the addendum to the HCP Handbook emphasizes the up-front development and earnest implementation of a structured monitoring program within and between HCPs. Because the Service and the applicant provide these ele-

Northern spotted owls
USFWS photo

ments in the HCP and are aware of what will be required, they are consistent with the assurances of No Surprises.

HCPs that use adaptive management must contain the key components that make the adaptive process meaningful. These components include identifying potential uncertainties in the HCP, incorporating a range of alternatives for addressing those uncertainties, implementing a monitoring program to determine the success of the alternatives, and establishing a feedback loop from the monitoring program that allows for change in the management strategies, if needed.

Adaptive management may increase the complexity of an HCP. However, adaptive management strategies should be commensurate with the scope of the HCP (e.g., the smaller the scope or impacts, the less complex the HCP and any adaptive management strategy that may be warranted). Permit applicants and the Services can use adaptive management as a tool to meet the statutory and regulatory criteria for HCP approval and the issuance of an incidental take permit. Adaptive management is also a means for increasing the flexibility of an HCP for permit applicants. Creating an HCP that is based on achieving results rather than fulfilling a list of prescriptive actions not only increases flexibility, it promotes desired biological outcomes. A results-oriented implementation program (such as adaptive management) allows a permittee to use a number of different methods for achieving a certain goal, rather than adhering to an inflexible list of prescriptions. In addition, a results-oriented program actually provides certainty to the permittee by establishing the framework for possible modifications in the HCP. Results are periodically assessed, and, if shortcomings are evident, previously agreed-upon alternative strategies are implemented, thereby streamlining discussions between the Services and permittee.

The Balcones Canyonlands Preserve in Travis County, Texas, has an area targeted for acquisition of habitat for the golden-cheeked warbler* (Dendroica chrysoparia)*, above, black-capped vireo* (Vireo atricapillus)*, and other species. Within the identified area, a target number of acres must be acquired for proper implementation of the Balcones Canyonlands HCP. Because the preserve is assembled over time, establishing a larger area from which to make acquisitions increases flexibility within the boundary while still meeting the conservation objectives of the HCP.
Photo by Steve Maslowski/USFWS

Many HCPs have incorporated contingency planning to some degree. However, they typically have not contained the formal structure for monitoring and feedback that would be part of a good adaptive management approach. Nonetheless, contingency plans do have value in achieving the conservation goals of an HCP. For example, many large-scale reserve-based HCPs outline areas of habitat to be conserved as mitigation for development and other impacts. Frequently, the area shown within the lines on the map is larger than the actual area to be preserved within those boundaries.

Contingency planning is often lumped together with adaptive management, particularly when implemented due to changed circumstances. In order to address changed circumstances, recent HCPs are bridging the gap between loosely structured contingency planning and more tightly structured adaptive management. In the adaptive management section of the City of Seattle's Cedar River HCP in the Pacific Northwest, there are contingency plans to be implemented in the event of various changed circumstances. For instance, in the event of a disease or insect outbreak, the City of Seattle may take measures to restore defoliated forest habitat by reprioritizing HCP funds for forest restoration or precommercial tree thinning.

One of the primary objectives of the HCP monitoring and research program is to assist the adaptive management process by providing information on the species of concern, testing critical assumptions in the plan, and providing a learning experience to refine management decisions. Key to the adaptive strategy are triggers that create the feedback loop from results from the monitoring program to changes in management. HCPs that have structured adaptive management strategies include Plum Creek Timber Company's Native Fish HCP and the Wisconsin Statewide HCP for the Karner blue butterfly *(Lycaeides melissa samuelis)*.

The Wisconsin Statewide HCP for the Karner Blue (see article in this issue) contains an adaptive management program that creates flexibility in meeting the biological goal of the HCP and the land management goals of the participants. The biological goal of the HCP is to insure the persistence of the endangered Karner blue butterfly on partner lands and work towards recovery on The Nature Conservancy lands and several State properties. Monitoring of Karner Blue populations is the cornerstone to the HCP's monitoring program. Habitat monitoring before and after treatments also play a role in the adaptive management strategy. The monitoring program will also evaluate the status and performance of the ongoing conservation management strategies. If the populations are significantly declining to meet a trigger then the responsible HCP partner may either conduct research or utilize current information to alter management. Changes may be made and the populations will continue to be monitored. Any good adaptive management program continues the feedback and evaluation even after initial management changes and in the Wisconsin Statewide HCP, if the species continues to decline despite initial efforts, other strategies will be put into play.

Newer HCPs are describing triggers and research up-front in order to provide more certainty in the implementation of the HCP. Plum Creek Timber Company's Native Fish HCP (NFHCP) contains a complex adaptive management program to learn and adjust the implementation of the HCP to achieve the biological goals. The biological goals of the HCP are the conservation of native salmonids through the maintenance of four conditions—cold water, clean water, complex habitat, and connected habitat (the HCP's biological goals). These biological goals are then broken down to fifteen habitat objectives. The NFHCP provides commitments to management actions for each of the habitat objectives. These manage-

Monitoring information obtained while implementing an HCP with Plum Creek Timber Company will improve conservation of the threatened bull trout.
Photos courtesy of Plum Creek Timber Co.

ment actions are monitored to ensure that management action is implemented properly and that it is achieving its intended result. Thresholds are established to trigger an adaptive management response. The triggers themselves are adaptable through a collaborative management agreement process if they are determined to be either too sensitive or not sensitive enough. This is a simplistic description of the complex adaptive management program that also incorporates research; concurrent to implementation and monitoring of the HCP, Plum Creek will be investigating the effects of various management strategies in anticipation using the results of this research to alter management in the HCP on a larger scale.

We will continue to incorporate contingency planning within all types of HCPs. In the future, HCPs will have improved structure in their adaptive management strategies. While complex, investigative adaptive management strategies are better suited for large, complex HCPs, smaller plans can be designed for adaptability, especially if they are viewed as part of a more comprehensive conservation strategy. Increased structure in adaptive management strategies will require increased vigilance on the part of the permittees and the Service during implementation of long-term plans; this reflects the nature of the conservation partnership created by HCPs.

Marj Nelson is a Biologist with the Division of Endangered Species, Office of Consultation and HCPs, in the Service's Arlington, Virginia, headquarters office.

References

Gunderson, L. 1999. Resilience, flexibility and adaptive management—antidotes for spurious certitude? *Conservation Ecology* 3(1): 7. http://www.consecol.org/vol3/iss1/art7.

Holling, C. S. (ed). 1978. *Adaptive Environmental Management and Assessment*. Wiley, Chichester.

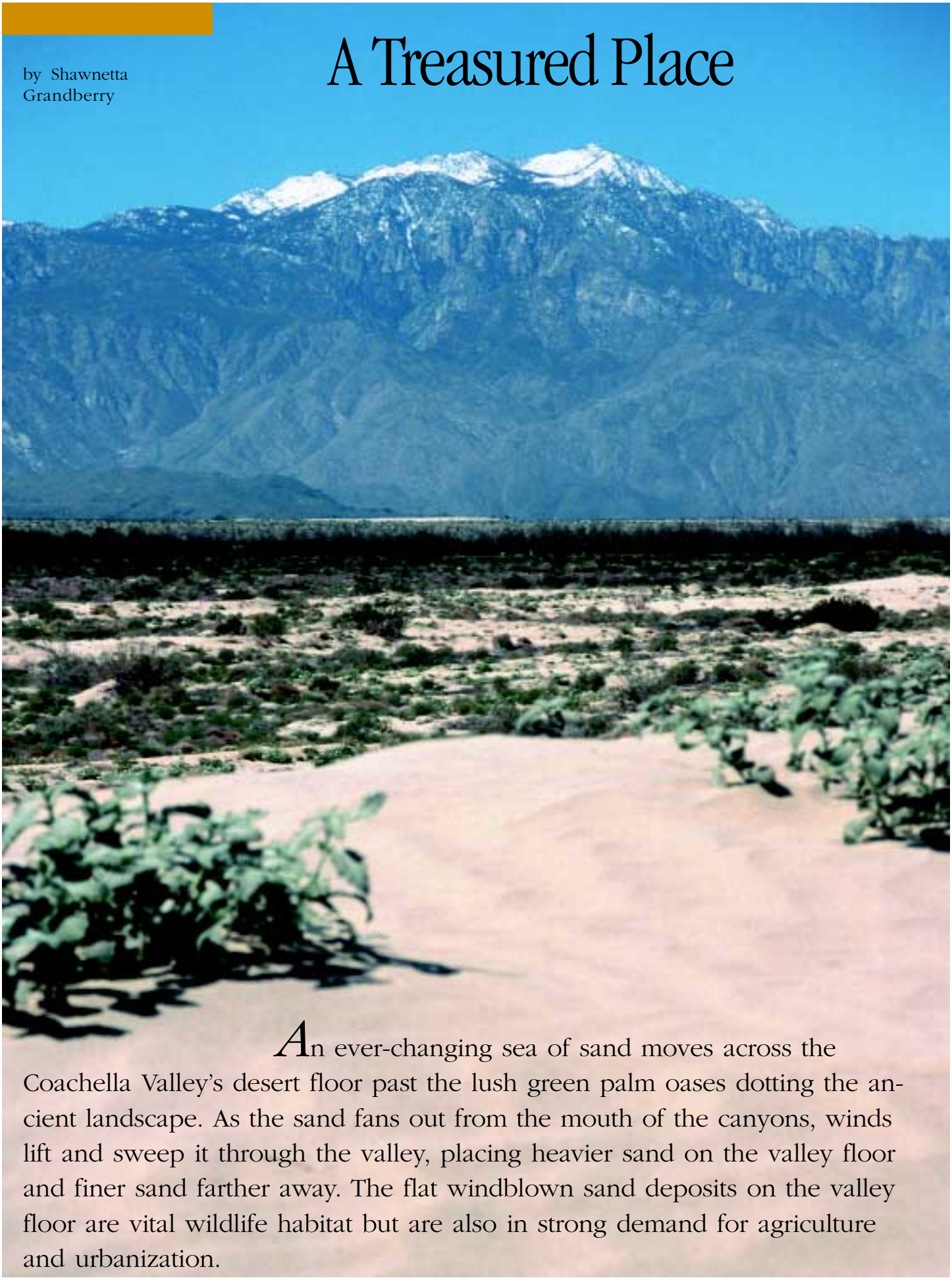
Walters, C. 1986. *Adaptive Management of Renewable Resources*. Macmillan, New York.

Plum Creek Timber Company. 2000. Plum Creek Final Native Fish Habitat Conservation Plan http://www.plumcreek.com/environment/hcp_links.html

Wisconsin Department of Natural Resources. 1999. Wisconsin Statewide Karner Blue Butterfly Habitat Conservation Plan and Environmental Impact Statement. http://www.dnr.state.wi.us/org/land/er/publications/karner/karner.htm

A Treasured Place

by Shawnetta Grandberry



An ever-changing sea of sand moves across the Coachella Valley's desert floor past the lush green palm oases dotting the ancient landscape. As the sand fans out from the mouth of the canyons, winds lift and sweep it through the valley, placing heavier sand on the valley floor and finer sand farther away. The flat windblown sand deposits on the valley floor are vital wildlife habitat but are also in strong demand for agriculture and urbanization.

The Coachella Valley is located in southeastern California at the northern end of the Colorado Desert, and is bordered by the Salton Sea to the south and the Little San Bernardino Mountains to the north. The "blowsand" ecosystem of the Coachella Valley supports a variety of unique animals and plants adapted to living in the harsh desert environment. Species such as the Coachella Valley fringe-toed lizard *(Uma inornata)*, Coachella Valley milk-vetch *(Astragalus lentiginosus* var. *coachellae)*, triple-ribbed milk-vetch *(Astragalus tricarinatus)*, and a variety of other endangered, threatened, and sensitive plants and animals depend on the dynamic blowsand ecosystem for their survival.

From prehistoric times to the early twentieth century, the Cahuilla Indians were the sole inhabitants of the Coachella Valley. As a hunter-gatherer society, the Cahuilla established a number of permanent and semi-permanent settlements within the valley. Beginning in the early 1900s, settlers established travel routes throughout the area and built permanent settlements. Agriculture, housing developments, off-highway vehicle recreation, and the introduction of non-native, invasive plant species (especially Russian thistle and tamarisk) have resulted in the decline of sand dunes and blockage of natural sand transport corridors. Today, more than 200,000 people reside in the Coachella Valley, and more than 1 million others visit the area each year. By 2010, the number of permanent residents is expected to double. The continuing development of the Coachella Valley will have significant effects on the long-term sustainability of the ecosystem. Without a concerted effort to conserve the sand transport system, the remaining blowsand habitat will become increasingly fragmented and could even disappear within 50 to 100 years.

In 1982, the Endangered Species Act was amended to allow for the development and implementation of habitat conservation plans (HCPs). These plans are designed to reduce conflicts between conservation and economic growth by fostering creative partnerships that address the conservation needs of listed species and continued economic prosperity. Although rarely used until the early 1990s, the HCP process has proven to be an effective conservation tool. In 1991, the state of California initiated its own version, the Natural Community Conservation Planning (NCCP) program. This program is a voluntary, cooperative approach that fosters economic growth by allowing development in certain areas while preserving key habitats for the long-term survival of native species. It has been widely applauded by developers, landowners, planners, and others. The NCCP program's primary goal is the protection of rare habitat types within a 6,000-square-mile (15,500-square-kilometer) area that covers portions of five southern California counties: San Diego, Orange, Los Angeles, Riverside and San Bernardino. This approach marks a departure from the traditional project-by-project review of impacts on sensitive species toward a more comprehensive landscape-based effort to conserve species and their habitat.

One of several large-scale HCPs underway within the southern California NCCP planning area is the Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP). This plan is being developed through a collaboration among government agencies and partners in the private, public, and nonprofit sectors, including the County of Riverside, nine cities, the Coachella Valley Association of Governments, California Department of Fish and Game, U.S. Forest Service, National Park Service, Bureau of Land Management, and Fish and Wildlife Service. This groundbreaking HCP will promote the protection of desert ecosystems on approximately 1.3 million acres (0.5 million hectares) in Riverside County.Initiated in 1993, the Coachella Valley MSHCP aims to preserve biodiversity by focusing on the needs of entire ecosystems, including their range of inhabitants, rather than on individual species. The goal of the plan is to conserve natural desert communities before their native species have declined to the point that protection under the federal and/or state endangered species acts is necessary. The plan would provide for the creation of a preserve system that protects sensitive desert habitat types such as riparian and desert dry wash woodland, blowsand habitat, mesquite hummocks, palm oases, and a mosaic of other native vegetation communities. The preserve system would provide for the long-term biological needs of 30 species, including the endangered peninsular bighorn sheep *(Ovis canadensis)*, desert slender salamander *(Batrachoseps aridus)*, least Bell's vireo *(Vireo bellii pusillus)*, southwestern arroyo toad *(Bufo microscaphus californicus)*, and other listed and sensitive plants and animals.

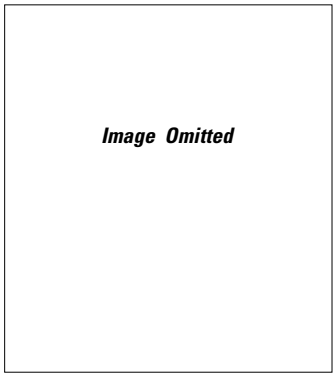
Participating federal, state, and local agencies will cooperate in implementing the conservation strategies outlined in the plan once it is adopted. Large-scale, long-term cooperative efforts such as the Coachella Valley MSHCP will become more important as human populations in and around the Coachella Valley increase.

Shawnetta Grandberry is an Information and Education Specialist with the Service's Carlsbad, California, Office.

Coachella Valley fringe-toed lizard
USFWS photo above and opposite page

by Lori Pruitt

Indiana's First HCP Conserves Least Tern



Nesting terns on the dike at Gibson Lake, Indiana
Photo © Ron Austing

The Cinergy Corporation's Gibson Generating Station is a 3,250 megawatt coal-fired electrical generating station that helps provide electricity to over 1.4 million Cinergy customers. But the facility produces more than electricity—it also produces habitat for Indiana's only colony of an endangered bird, the interior least tern *(Sterna antillarum)*.

The Gibson Generating Station is located adjacent to the Wabash River in southwest Indiana's Gibson County. Almost half of the facility is covered by Gibson Lake, a 2,964-acre (1,200-hectare) shallow impoundment that provides cooling water for the plant. A prominent feature of the lake is a dike, 16 feet (5 meters) wide and over 2.1 miles (3.4 kilometers) long, that nearly bisects the lake.

In 1986, a single pair of least terns was discovered nesting on the dike. The endangered interior least tern is typically found on barren beaches and gravel bars on large river systems of the interior United States, and the gravel-covered dike of Gibson Lake simulated this habitat. When the terns were discovered, Cinergy immediately began a cooperative program with the Indiana Department of Natural Resources (IDNR) to protect the nesting birds, and later to conserve and enhance their habitat. Activities voluntarily conducted by Cinergy in cooperation with the IDNR included vegetation control on the center dike, maintaining the nesting substrate on the dike, controlling human access to nesting areas, steps to minimize losses to predators, use of decoys and taped vocalizations to attract terns, and providing chick shelters near the nests. Cinergy also facilitated the annual monitoring of the colony, which is conducted by the IDNR. Cinergy's efforts were successful in attracting nesting terns to return in subsequent years and the population has increased, although the level of nesting activity varies annually. The largest population ever observed at Gibson Lake was in 1998, when 85 adults produced 72 fledglings. Productivity of the colony has generally been high compared to other monitored populations. Cinergy was the 1999 regional winner of the Fish and Wildlife Service's National Wetland Conservation Award, in part because of the company's efforts to conserve the least tern.

The first potential conflict between the tern colony and the operation of the generating station was realized 7 years after discovery of the initial nest. Beginning in 1993, terns not only nested on the dike of Gibson Lake but also began nesting in ash disposal ponds, where ash from coal combustion is deposited as a slurry. In 1996, they also were observed nesting on gravel access roads associated with the ash ponds. Cinergy had voluntarily restricted access to the Gibson Lake dike during tern nesting season, but restricting access to ash disposal areas and access roads was more difficult. Nonetheless, the company was successful in avoiding take of

terns in these areas by altering their operations (e.g., moving ash deposition lines and avoiding the use of roads when terns were present). However, Cinergy was concerned that conditions could arise when incidental take of terns associated with ash disposal areas would be unavoidable, and so it approached the Service for advice on how to deal with the potential for take.

The solution Cinergy chose was to develop a Habitat Conservation Plan (HCP), the first in Indiana, for the least tern colony. In its HCP, the company pledges to continue with efforts to protect and enhance habitat on the center dike of Gibson Lake, which remains the primary nesting area for the tern colony. In addition, Cinergy is cooperating with the Service and other partners in development and maintenance of the Cane Ridge Wildlife Area. The restoration of the 463-acre (187-ha) Cane Ridge Wildlife Area, which will be managed as a unit of the Patoka River National Wildlife Refuge, is a North American Waterfowl Management Plan project. The project involves over 15 partners joining forces to restore bottomland hardwood forests and other wetland habitats in an area that had been altered for farming. A unique feature of the restoration is that it will include the construction of least tern nesting islands in shallow impoundments. The Cane Ridge Wildlife Area is immediately adjacent to Gibson Generating Station, and we hope that the Gibson Lake colony will serve as a source of birds to colonize the newly created habitat. Ultimately, these colonies may also serve as a source of birds to colonize suitable habitat along the nearby Ohio and Wabash rivers. Regardless of the outcome, studies on the development of least tern nesting units at Cane Ridge and continued monitoring of the Gibson Lake colony will provide information helpful to the recovery of the species.

As a result of Cinergy's HCP, the Service issued the company a permit that allows for the incidental take of least terns at the Gibson Generating Station for the next 5 years. The level of take in a given year will not exceed 5 percent of the maximum adult population of least terns present at the facility in that year. Cinergy is hopeful that it will be able to continue to avoid any take of terns. However, the incidental take permit will provide Cinergy with assurances that it can continue to maintain and operate the Gibson Generating Station without the risk of violating the Endangered Species Act. The net result of activities proposed in the Cinergy HCP will be increased nesting opportunities for the interior least tern.

"When endangered least terns began nesting at Gibson Station, we were concerned that the Endangered Species Act might limit or impact our ability to generate and deliver power from our largest generating station" said Tim Hayes, Senior Environmental Scientist at Cinergy. "However, through close cooperation with the Fish and Wildlife Service and the Indiana Department of Natural Resources, we have developed this Habitat Conservation Plan which will protect and enhance tern populations while allowing us to continue providing power to our customers."

Lori Pruitt is a Fish and Wildlife Biologist in the Service's Bloomington, Indiana, Field Office.

Cinergy Corp.'s Gibson Generating Station is home to Indiana's only colony of the endangered interior least tern. The primary nesting area is the dike at Gibson Lake (pictured), an impoundment that provides cooling water for the plant. Cinergy was the 1999 regional winner of the U.S. Fish and Wildlife Service's National Wetland Conservation Award, in part because of their efforts to conserve the least tern.
Cinergy Corp. photo

Butterflies Benefit from Statewide HCP

by Lisa Mandell

Secretary of the Interior, Bruce Babbitt, looks on while Fish and Wildlife Regional Director Bill Hartwig (left) and Wisconsin DNR Secretary George Meyers sign the implementing agreement.
Photo by John Christian

Opposite page:
(top) An adult Karner blue butterfly, subject of the statewide HCP.
Photo by Richard Fields/USFWS

(center) Wild blue lupine is the food plant for Karner blues during their larval stage.
Photo by Joel Trick

(bottom) Important Karner blue habitat such as this will be protected under the statewide HCP.
Wisconsin DNR photo

Endangered Karner blue butterflies *(Lycaeides melissa samuelis)* in Wisconsin will be protected by the first comprehensive statewide conservation agreement authorized under the Endangered Species Act (ESA). The agreement, known as the Wisconsin Statewide Habitat Conservation Plan (HCP) for the Karner Blue Butterfly, will be implemented on more than 260,000 acres (105,200 hectares) of potential and existing butterfly habitat in Wisconsin. The incidental take permit issued for this HCP allows landowners, businesses, and governments to continue land management activities.

"This is the first comprehensive statewide HCP and the most inclusive agreement of its kind in the country," Interior Secretary Bruce Babbitt said at a September 27, 1999, signing ceremony at the Sandhill Wildlife Area in Babcock, Wisconsin. "It is an excellent example of how the flexibility of the Endangered Species Act can promote regional habitat conservation planning by states and local partners and is a model for what other states and their partners might consider."

An HCP provides conservation measures that minimize and mitigate impacts on endangered species while allowing economic development to continue. Permits issued by the Fish and Wildlife Service allow landowners to "take" individual endangered species for which HCPs have been developed when such take occurs incidental to otherwise lawful activities. Currently, there are more than 300 HCPs in effect nationwide, and more than 250 are under development.

Wisconsin Department of Natural Resources (DNR) Secretary George Meyer signed the Implementing Agreement for the HCP on behalf of the state. The Karner blue butterfly HCP was developed by the Wisconsin DNR in coordination with the Service's Ecological Services Field Office in Green Bay, Wisconsin, and in conjunction with 25 private and public partners, including county and industrial forest owners; utility companies; the Wisconsin Department of Transportation; the Wisconsin Department of Trade, Agriculture, and Consumer Protection; and The Nature Conservancy.

"Most HCPs involve localized areas with only one or a few partners," said Secretary Babbitt. "What is unique about Wisconsin's HCP is that it is statewide in scope and involves 26 partners working across an extensive landscape. These partners represent most of the significant private and public landowners within the Wisconsin range of the Karner blue butterfly."

The Wisconsin DNR was issued an incidental take permit for the butterfly during the HCP signing ceremony. Each partner receives incidental take privileges under the permit and the purview of the state. Other landowners can become partners to the HCP through an application process. In addition, the HCP identified a voluntary (unregulated) private landowner group that is automatically covered for incidental take by the permit.

The statewide HCP includes such conservation measures changing the timing of mowing and herbicide applications to the fall to protect plants used by the butterflies, the creation of habitat corridors linking Karner blue

butterfly sites, and maintaining a shifting mosaic of suitable habitat for the butterfly throughout the landscape.

"Partners will continue with normal activities such as mowing, burning, herbicide application, and forestry practices in such a way as to avoid or minimize hazards to the Karner blue butterfly," said Dave Lentz, Wisconsin's Karner blue butterfly HCP Coordinator. Many other rare species require similar habitat and will benefit from the conservation efforts taken under the HCP. These include animals such as the Kirtland's warbler *(Dendroica kirtlandii)*, slender glass lizard *(Ophisaurus attenuatus)*, eastern massasauga rattlesnake *(Sistrurus c. catenatus)*, Blanding's and wood turtles (*Emydoidea blandingi* and *Clemmys insculpta*, respectively), Persius dusky wing butterfly *(Erynnis persius)*, and plants such as the prairie flame flower *(Talinum rugospermum)* and sand violet *(Viola fimbriatula)*.

The Karner blue is a small, mostly blue butterfly with a wingspan of about 1 inch (2.5 centimeters). While most animal species rely on a stable habitat, Karner blue butterflies depend on disturbances within their habitat to create or maintain openings for the growth of its larval food plant, wild blue lupine *(Lupinus perennis)*. In its early life as a caterpillar, the Karner blue eats only the leaves of the lupine, which depends on open sandy habitats such as oak savanna and pine barrens. In Wisconsin, the butterfly lives in utility and roadway rights-of-way, abandoned agricultural fields, forest lands, military training areas, and remnant barrens, savannas, and prairies that support wild lupine plants.

For more information on the HCP, check out this website: http://midwest.fws.gov/eco_serv/endangrd/insects/kbbhcp.html.

Lisa Mandell was the Permits Coordinator for the Service's Twin Cities, Minnesota, Regional Office from February 1995 through January 2000.

Deep in the Heart of Texas

by Luela P. Roberts

Bone Cave harvestman
Photo by Wyman Meinzer/USFWS

Service biologist and landowner examine cave entrance
Photo by Luela Roberts/USFWS

The biologically diverse Texas Hill Country, composed of a wide swath of the Edwards Plateau west of the Balcones Escarpment, is home to 9 endangered species (3 birds and 6 karst invertebrates), more than 70 other rare animal and plant species, and a wide diversity of common species. This wild and beautiful area, with its mild climate and usually plentiful water, is dominated by shallow topsoil overlying limestone deposits up to 10,000 feet (3,050 meters) deep. It is also home to more Habitat Conservation Plans (HCPs) than any other region of the United States.

Karst features are formed by the dissolution of calcium carbonate in limestone bedrock by mildly acidic groundwater. They can take the form of caves, sinkholes, cracks, and crevices that may or may not be interconnected. Most karst features are too small for humans to enter. Although some may contribute to the recharge of underground stream systems, most in this region are considered "dry" because they have little, if any, perennial water flow or small catchment areas for surface run-off. However, humidity is often near 100 percent in these karst features and the temperature is relatively constant. Because of the absence of light for photosynthesis, cave dwellers depend on food and energy in the form of invertebrates and other animals from the surface, animal droppings, and leaf litter washing in from the cave entrance. Cave crickets and harvestmen or "daddy longlegs" that live inside the caves during the day and feed outside the caves at night contribute important nutrients to the cave ecosystem. Raccoons and other small animals that hide and den in the caves are also very important contributors. Raccoon feces provide a growth medium for bacteria and fungi that supports a minute prey species (springtails). Surface plant materials also provide buffers against temperature and moisture changes.

All six endangered karst invertebrates in the Texas Hill Country are troglobites that spend their entire existence underground and have adaptations to subterranean environments, including small or absent eyes and elongated appendages. The Tooth Cave spider *(Neoleptoneta myopica)* is a small, whitish, long-legged spider with obsolescent eyes. The Tooth Cave pseudoscorpion *(Tartarocreagris texana)* is a large, eyeless pseudoscorpion with elongated appendages. The Bee Creek Cave harvestman *(Texella reddelli)* is an orange daddy longlegs with an increased leg/body ratio and well developed eyes, while the Bone Cave harvestman *(Texella reyesi)* is long-legged, pale orange, and blind. The Kretchmarr Cave mold beetle *(Texamaurops reddelli)* is a small, long-legged, and shiny reddish-brown beetle without eyes. Also reddish-brown, the Tooth Cave ground beetle *(Rhadine persephone)* is more robust than other species of the subterranean group.

Historically, many cave entrances were blocked or covered to prevent injuries to livestock and eliminate hiding places for predatory animals. The greatest threat to these endangered karst invertebrates is habitat loss or degradation due to urban encroachment. Urban development in karst areas can cause caves to collapse or be filled in, change surface plant and animal communities,

and expose caves to contamination. Development can also alter drainage patterns, and increases in human population can expose caves to damaging exploration and vandalism.

Exotic plants or impervious cover often replace native vegetation near karst features. The absence of native plants may result in increased temperature and humidity fluctuations, lead to sediment build-up in caves, and promote infestations of non-native red fire ants *(Solenopsis invicta),* which prefer open areas where soils have been disturbed. Fire ants prey on karst invertebrates and the surface community food base upon which the karst species depend. The use of pesticides or fertilizers can also adversely effect or eliminate species when applied inappropriately. Additionally, changes in drainage patterns can cause flooding and the loss of air-breathing karst species, or can desiccate the cave by the diversion of water. Karst features with low humidity levels are usually devoid of fauna, suggesting that humidity may be a key factor in the survival of these cave invertebrates.

Several HCPs in central Texas cover one or more of the endangered karst species. The Buttercup Creek HCP, for example, was developed for the protection of the Tooth Cave ground beetle. This tiny animal is endemic to only a few karst features within a small area near the City of Cedar Park in Williamson County. The Buttercup Creek HCP ensures that 12 separate cave preserve areas totaling 130 acres (53 hectares) and 2 greenbelt floodplain areas comprising 33 acres (13 hectares) will be protected and monitored in perpetuity. Many other species inhabiting these areas will benefit as well. Conservation measures include gating significant cave entrances, routine inspections and maintenance work, restrictions on recreational use of some areas (with no public access to the most sensitive sites), vegetation management to control noxious non-native plants and excess growths of juniper, and control of fire ants. Any unforeseen circumstances, such as storm damage, vandalism, or wildfires at the cave preserves, will be addressed immediately to limit potential damage.

Karst ecosystems are a rich part of the biodiversity of central Texas that could have been lost without the protection provided for by HCPs and private landowner participation. The Service thanks the citizens of central Texas for their contributions to these conservation efforts.

Luela Roberts is a Fish and Wildlife Biologist in the Service's Albuquerque, New Mexico, Regional Office.

A cave entrance blocked with juniper branches to keep out unwanted visitors
Photo by Luela Roberts/USFWS

by Ted Owens

Washington County's HCP: Four Years Later

Photo above and opposite page © Rick Fridell

In the May/June 1996 *Endangered Species Bulletin*, biologist Marilet Zablan outlined the difficult process of developing a Habitat Conservation Plan (HCP) for Washington County, Utah. The plan was designed to protect important desert tortoise habitat while allowing development to proceed in many less sensitive areas. So how is it working?

Washington County, located in the southwestern corner of Utah, is one of the fastest developing parts of the United States. This area also contains vital habitat for the threatened Mojave population of the desert tortoise *(Gopherus agassizii).* In 1996, to resolve conflicts between development pressures and the well-being of the tortoise, the Fish and Wildlife Service issued the Washington County Commission a 20-year, county-wide permit for incidental take of the tortoise in accordance with the county's approved Habitat Conservation Plan.

Administratively, the plan is functioning well. The Washington County Habitat Conservation Advisory Committee (HCAC) meets monthly about important issues concerning the tortoise reserve, such as proposals for the installation and maintenance of utility lines, minor boundary changes, administrative budgets, and quarterly reports prepared by the county.

When the HCAC needs biological input on proposals (e.g., construction of a utility line), it assigns the technical committee the task of reviewing the matter and providing advice on any biological impacts. The technical committee is composed of biologists and land managers from various agencies. The HCAC then uses this advice in making its determinations, which must receive approval from the Service. Utility development is discouraged within the reserve, and must follow strict guidelines if no other practical alternative is available.

Since issuance of the permit, about 1,500 acres (600 hectares) of habitat have been legally cleared of tortoises and are in various stages of residential and commercial development. A total of 161 tortoises have been legally "taken." Since permit issuance, the tortoise issue has largely fallen by the wayside for most Washington County residents.

Biologically, much has been accomplished on the ground to benefit the desert tortoise.

First and foremost, a contiguous reserve has been established. The Dixie (Utah) Field Office of the Bureau of Land Management (BLM) has moved quickly to carry out land exchanges and acquisitions. To date, 4,320 acres (1,750 ha) worth some $36 million have been acquired for the reserve by the BLM or state of Utah. Most of this acquisition has been through exchanges, although some parcels were bought with funds from the Service and the Land and Water Conservation Fund, and other parcels were donated. If more extensive development had continued within what is now the reserve, tortoise populations would be more fragmented today and they would most likely eventually succumb to extirpation.

In addition to land acquisition, a list of accomplishments completed in the past 5 years is nothing less than amaz-

Desert tortoise habitat covered by the Washington County HCP also benefits other sensitive species in the area.

ing. Because cattle compete with tortoises for forage, some 99 percent of grazing permits within the reserve's tortoise habitat have been retired by Washington County. The county also has funded a full-time BLM law enforcement officer whose sole responsibility is protection of the reserve. The BLM also has prohibited off-road vehicle (ORV) use except on a few select designated roads and trails. Consequently, formerly degraded habitat has become noticeably healthier. Further, the BLM has withdrawn the entire reserve from new mining claims. On its part, Washington County employs a full-time WCHCP administrator, biologist, and technician who coordinate and carry out the day-to-day activities vital to accomplishing conservation measures on the ground. The county also annually funds seasonal technicians with the Utah Division of Wildlife Resources (UDWR) to monitor tortoise populations within the reserve. Over 30 miles (48 kilometers) of fencing have been built by various entities to exclude desert tortoises from roads or other hazards and to control illegal dumping, vandalism, and ORV use.

Development of a nature education center focusing on sensitive reserve species is forthcoming. In the meantime, Washington County has provided information on tortoises and other wildlife to thousands of its residents, thereby increasing public support for the reserve. The county has also helped fund a multi-species plan for other wildlife in the reserve, which summarizes current knowledge and contains strategies for monitoring various sensitive species throughout the county, including six other listed species and dozens of species of concern. A translocation experiment is providing valuable information about which habitats tortoises prefer, how far they will travel, and whether or not successful translocation is even possible.

Although the HCP's implementation generally is going well, there are several areas of concern. Many local residents feel that the reserve should be open to unlimited recreational use. The Service, UDWR, and BLM are concerned that unrestrained recreation could have harmful impacts on the tortoises and their habitat. A public use plan has been developed to address these issues. Another ongoing area of concern is the cost of acquiring the remaining 12,000 or so acres (4,850 ha) of property within the reserve**.** The BLM has done an outstanding job in acquiring reserve property as quickly as administratively possible, but it has a limited budget and has been unable to acquire some needed acreage quickly enough to avert the threat of development. Properties within the reserve still to be acquired are currently worth about $100 million.

Despite some areas of contention, the Washington County HCP is promoting tortoise and other species conservation while accommodating the demand for development.

Ted Owens is a Fish and Wildlife Biologist with the Service's Salt Lake City, Utah, Office.

Forest Land HCPs: A Case Study

by Craig Hansen and
William Vogel

The Washington Department of Natural Resources (DNR) manages nearly 1.6 million acres (650,000 hectares) of forest land in Washington within the range of the northern spotted owl *(Strix occidentalis caurina)*. It is responsible for ensuring that healthy, productive forests remain and that its designated trust beneficiaries receives a continuous income. When the spotted owl and marbled murrelet *(Brachyramphus marmoratus)* were proposed for listing and several salmon species were listed as threatened, this created an uncertain future that would make it difficult for the DNR to fulfill its trust responsibilities. Faced with halting logging in many areas and spending money on wildlife surveys, the DNR chose instead to develop a Habitat Conservation Plan (HCP). Now it can comply with the Endangered Species Act while producing income for its trust beneficiaries.

The DNR began by establishing a science team of state, federal, and independent scientists to address owl, murrelet, and salmon conservation needs. Aided by recommendations from the owl and murrelet draft recovery plans, the President's Northwest Forest Plan, and the latest scientific reports, the science team provided the foundation for the HCP strategies.

The science team advised that the approach to conserve owls hinged on the proximity of DNR-managed lands to federal lands that are managed under the Forest Plan. The lands that the DNR designated to contribute demographic support for owls were generally within 2 miles (3.2 km) of federal late succession reserves. Lands designated to provide dispersal habitat for juvenile owls were located between federal land tracts or between DNR demographic land tracts. They complemented the adjacent federal reserves to ensure that large blocks of mature forest were available across the landscape for owls and other species. These actions formed the basis of the Washington Department of Natural Resources Habitat Conservation Plan (the DNR HCP), which was signed in 1997.

Northern spotted owl
Photo by William Vogel/USFWS

Because we know so little about murrelet ecology and the attributes of murrelet-occupied forest stands, the DNR developed a short-term conservation strategy. This consists of research that examines the relationship between habitat quality and the level of murrelet occupancy as well as interim protection measures for all occupied sites. After the habitat-relationship study is concluded and the habitat likely to be inhabited by murrelets has been surveyed, the Fish and Wildlife Service and DNR will jointly develop a long-term plan for the remainder of the HCP term.

To address the needs of salmon and other aquatic and riparian species, the DNR is committed to providing riparian buffers on all fish-bearing and perennial streams without fish. These buffers will provide a riparian habitat that stabilizes banks, filters sediment, maintains shade, and allows large trees to fall into the stream system. Large wood in streams stores sediment, adds habitat complexity, and provides habitat for fish and amphibians. Riparian buffers on fish-bearing streams will average about 150 feet (46 meters) wide on each side, while buffers on the fishless streams will be about 100 feet (31 m) wide. Some management will be allowed within these buffers only if it does not prevent the buffer from providing fully functional aquatic and riparian habitat.

In addition, the DNR HCP also attempts to reduce impacts on nonlisted

species by implementing seasonal protection measures that minimize disturbance at nest and den sites. For instance, in areas managed for owl demographic support, timber harvest activities are prohibited within 0.55 mile (0.88 kilometer) of active northern goshawk *(Accipiter gentilis)* nests, and within 0.5 mile (0.8 km) of active fisher *(Martes pennanti)* dens.

Minimizing the impact of roads is also important to incorporate into forest land HCPs. We accomplish this by developing a road management plan to reduce sediment delivery to streams and facilitate fish passage to streams that formerly carried fish. The DNR has committed to reducing access to roads, abandoning or reconstructing problem roads, improving road construction, and installing culverts that are capable of withstanding a 100-year flood.

The multi-species strategy provisions in this HCP ensure that a range of forest age classes, including deciduous trees, and migratory corridors, is provided across the landscape. Many uncommon habitat types also require protection if an applicant desires coverage for listed species and unlisted species such as bats and cavity nesting birds. A green tree and snag retention strategy focuses on protecting large snags that may be used by species such as Vaux's swift *(Chaetura vauxi)*, pileated woodpeckers (*Dryocopus pileatus*), and myotis bats. Other unique habitats protected with forested buffers include talus slopes used by the uncommon Larch Mountain salamander *(Plethodon larselli)*, caves inhabited by bats and small mammals, seeps and springs inhabited by salamanders, and cliffs that may function as peregrine falcon (*Falco peregrinus*) aeries (nest sites). Most wetlands will have buffers at least 150 feet wide to protect habitat for such species as the northwestern pond turtle *(Clemmys marmorata)* and the Cascades frog *(Rana cascadae)*.

The combination of owl, murrelet, and riparian protection will eventually provide at least 520,000 acres (210,000 ha) of mature forest habitat. While some biological uncertainty exists, adaptive-management strategies were developed that allow for changes in certain management strategies as new information is obtained. For instance, the DNR may have to increase the percentage of down wood required for prey-base support of the owl, from the level currently agreed upon to some higher level, based on additional scientific information.

Monitoring of HCPs is necessary to ensure that all elements are being implemented. The type of monitoring and the amount of effort involved reflects the level of certainty of the conservation strategy and the level of adaptive management. The DNR conducts annual reporting meetings to document progress toward its commitments, the results of surveys, and findings of research efforts. The Fish and Wildlife Service and National Marine Fisheries Service participate in periodic meetings, conduct compliance monitoring, and participate on implementation and adaptive-management teams. Forest land HCPs are dynamic conservation plans. We expect ongoing adjustments in this process to incorporate the latest science and to respond to new developments in the large experiment in ecosystem management of which this HCP is a major component.

Craig Hansen is supervisor of the HCP Program in the Service's Western Washington Field Office, Lacey, Washington. William Vogel is a wildlife biologist with the newly formed Branch of Monitoring and Evaluation in the Western Washington Office. The authors were co-leads on this HCP project.

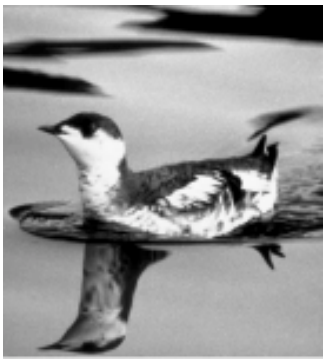
Trees along this salmon and steelhead-bearing stream will be conserved to protect water quality by reducing erosion.
Photo by Ted Thomas/USFWS

Multi-species HCPs: Experiments with the Ecosystem Approach

by William Vogel and Lorin Hicks

Image Omitted

***The red-legged frog* (Rana aurora), considered a species of concern in Washington State, will benefit from wetland protection and riparian buffers left along streams.**
Photo by Bill Leonard



Habitat management for the marbled murrelet, an elusive bird listed in the Pacific Northwest as threatened, is complicated by the incomplete knowledge of its ecological needs and the threats it faces.
Photo by Gus van Vliet/USFWS

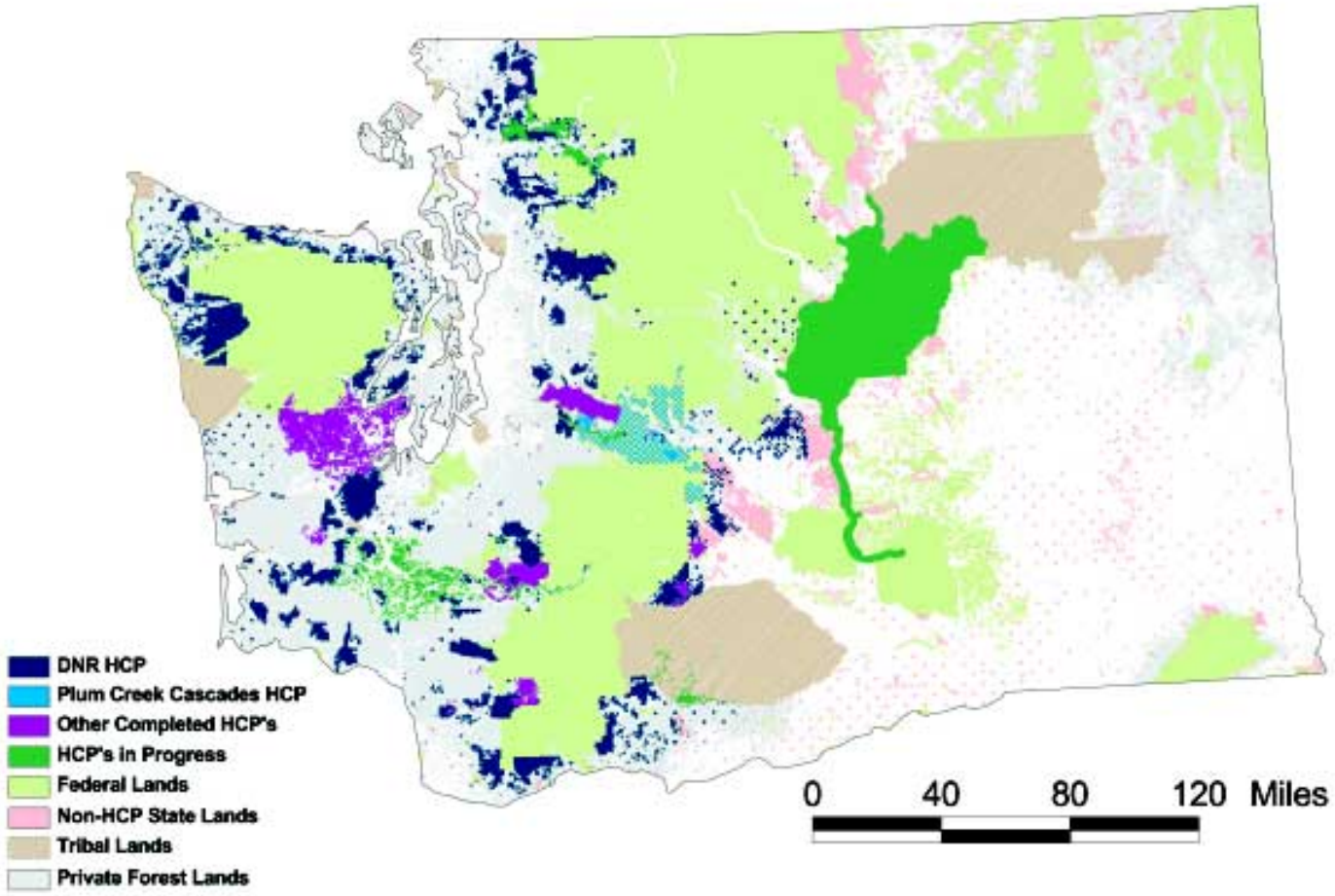
Habitat Conservation Plans (HCPs) can be a tool for the transition from reactive species-by-species management to the generally more effective ecosystem approach. In Washington State, for example, the Fish and Wildlife Service (FWS) is working with private landowners on HCPs covering several million acres. These HCPs vary in size, configuration, and location, but they share three components: (1) mature forest with structure; (2) healthy riparian/aquatic systems; and (3) protection of sensitive habitats. The strategies to address these three components form the foundation of many multi-species, habitat-based HCPs.

Considerable information is available about northern spotted owl *(Strix occidentalis caurina)* biology and habitat requirements. The threats to the owl are primarily from habitat modification, but its status does not prevent opportunities for management or experimental silviculture to maintain or accelerate habitat development. The owl conservation measures in many HCPs have focused on mitigation, including the provision of dispersal habitat across the landscape to make up for removal of isolated patches of nesting habitat.

Far fewer management options are available for marbled murrelets *(Brachyramphus marmoratus)*, partly because we have little knowledge about the quality or quantity of habitat they need, the effects of a changing marine environment, and direct losses at sea from drift nets, oil spills, and other factors. Identification of potentially suitable habitat, surveys for presence, and direct protection measures are generally combined in some fashion to avoid taking murrelets.

Conservation measures for aquatic species in the Pacific Northwest are designed to restore properly functioning riparian and aquatic habitats. Fish, especially salmon, are often limited by many factors, and strategies for fish recovery are necessarily complex. Therefore, rather than numbers of fish, most HCPs use quality of habitat as a measure of success. The National Marine Fisheries Service (NMFS) and Native American Tribes in the region have worked with several HCPs sponsors to develop plans for improving spawning habitats on forest lands. Fishing (commercial, recreational, and subsistence) and clean water issues have a direct effect on the health and livelihood of many people, so these HCPs provide benefits beyond protecting endangered species, and public and tribal involvement are expected to continue. Riparian conservation strategies, road management, identification of risks (such as landslides and erosion), and site-specific prescriptions are generally used to minimize impacts to native fish.

Once the key species and issues for an HCP have been identified, the next step is to decide how best to provide for the conservation of those species. Recovery plans or similar conservation documents are reviewed for guidance on the appropriate role a particular



Habitat Conservation Plans in Washington

landscape should play in the species' conservation. For example, a number of state and federal documents addressing spotted owls, such as the Final Draft Recovery Plan and the President's Forest Plan provided guidance for the Plum Creek HCP and outlined the need for mature forest habitat.

Most riparian conservation strategies incorporate aspects of biology, hydrology, and geomorphology. Vulnerabilities and opportunities are assessed locally, prescriptions are developed, results are monitored, and, if needed, the ability to adjust to new information is incorporated. For example, unstable slopes are identified and methods are developed to minimize the chance of slope failure. Forests with a certain density and tree size are retained along streams to provide for natural functions of shade, bank stability from roots, recruitment of large woody debris, and the needs of other terrestrial and riparian wildlife.

In addition to addressing two of the three most common landscape concerns (mature forest with structure and healthy riparian/aquatic systems), special habitats such as caves or talus slopes need to be identified and protected. Prescriptions developed to maintain the value of these habitats incorporate the exclusion of roads or other surface disturbances, the protection of forested buffers around these habitats, or management treatments to restore and maintain their value.

Because many species have similar needs, it can be useful to group them into "guilds" by habitat requirements. This can facilitate the evaluation of habitat availability and management impacts. Once this guilding is completed, information regarding existing habitats and their potential productivity, the effects of planned management on habitat conditions, and the projected growth, availability, and juxtaposition of these habitat types can be used to evaluate the different HCP alternatives.

Results of completed HCPs suggest that some tradeoffs may be necessary between groups of wildlife in a multi-species HCP (e.g., some species need habitats in early successional stages, while others need late successional habitat). Species-by-species management is difficult because of the large number of animals and plants involved, the complex array of life-history needs,

the lack of knowledge about many species, and the sometimes conflicting needs of species. It is much easier to manage for the maintenance and diversity of habitat (structures, functions, and vegetative communities) by emulating natural processes as much as possible within management constraints.

Ecosystem management and multi-species HCPs are in a phase of rapid evolution. They provide the opportunity to evaluate alternative approaches to landscape management, and as such resemble a conservative experiment on a grand scale. The experience we gain should be valuable in refining future HCP and landscape efforts, especially where adaptive management is factored in by design rather than by default.

Dr. Lorin Hicks, Director of Fish and Wildlife Resources for Plum Creek Timber Company, is responsible for wildlife management on over 7.9 million acres in Washington, Idaho, Montana, Arkansas, Louisiana, and 16 other states. William Vogel, a Wildlife Biologist with the FWS Branch of Monitoring and Evaluation in Olympia, Washington, previously worked on the FWS HCP team and served as technical advisor to a number of HCP biologists in several states.

(right, top) This road was closed to protect grizzly bear habitat as part of the Plum Creek HCP.
Photo by William Vogel/USFWS

(right) Loggers have left trees along a fish-bearing stream in the foreground and perennial non-fish streams in the background. The buffers provide a source of woody debris to enhance aquatic habitat, stabilize the banks, filter sediment, and maintain appropriate water temperatures.
Photo by Craig Hansen/USFWS

During April and May 2000, the Fish and Wildlife Service and National Marine Fisheries Service (NMFS) published the following Endangered Species Act (ESA) listing actions in the *Federal Register*. The full text of each proposed and final rule can be accessed through our website:
http://endangered.fws.gov.

Proposed Rules

Mississippi Gopher Frog The Service proposed on May 23 to list the Mississippi population of the dusky gopher frog *(Rana capito sevosa)* as endangered. Historically, this distinct population segment existed in the longleaf pine forests of the lower coastal plain from east of the Mississippi River in Louisiana to the Mobile River delta in Alabama. It has not been seen in Louisiana since 1962 or in Alabama since 1922. Today, only 100 adult frogs remain, all in one pond in Harrison County, Mississippi. Biologists believe loss and degradation of habitat is the primary reason the species has declined.

The Mississippi gopher frog is a mid-sized stocky frog that reaches 3 inches (7.5 centimeters) in length. It ranges in color from black to brown to gray. The frog's habitat includes both longleaf pine forest and isolated, temporary breeding sites in forested landscapes. Adult frogs spend most of their lives underground in forests with an open canopy and abundant ground cover. They use active and abandoned gopher tortoise *(Gopherus polyphemus)* burrows, abandoned mammal burrows, and holes in and under old stumps as their underground retreats.

Because of the small number of remaining Mississippi gopher frogs, the species is extremely vulnerable to even natural processes such as drought and floods, and to further loss, damage, and fragmentation of its habitat. These threats, singly or combined, could cause the frog's extinction.

The single breeding pond used by the frogs is located at the edge of Mississippi's DeSoto National Forest, just 656 feet (200 meters) from a proposed 4,600-acre (1,860 hectare) residential development. This project and the associated development it would bring to the area, including highways and a proposed reservoir, could damage or destroy the frog's only remaining habitat.

Natural fires historically have been essential to maintaining the frog's habitat but now are controlled. Biologists have used prescribed burns to maintain the habitat. If development occurs near the breeding pond, however, they may be limited in the use of this management tool because of concerns about public safety and smoke.

Only those landowners in the immediate vicinity of the breeding pond would be affected by the proposed listing. Recreational land use activities such as hunting and fishing would not be affected. The Service has been working with the U.S. Forest Service since 1988 to protect the last remaining Mississippi gopher frog population. In addition, both agencies have joined forces to rehabilitate a nearby pond as a future breeding site for the rare frog. The Service, in conjunction with researchers at Southeastern Louisiana University, has developed a strategy to introduce egg masses into this pond and to determine if the eggs can successfully develop into juvenile frogs at the site.

Two Oregon Plants On May 15, the Service proposed to protect two rare plants in southwestern Oregon, Cook's lomatium *(Lomatium cookii)* and the large-flowered wooly meadowfoam *(Limnanthes floccosa* ssp. *grandiflora)*, as endangered. Cook's lomatium, a member of the carrot family (Apiaceae), is a small perennial with pale yellow flowers. The meadowfoam,which belongs to the false mermaid family (Limnanthaceae), is a small annual with whitish petals and fuzzy leaves.

Both plants grow in a type of seasonal wetland known as a "vernal pool" in the Agate Desert in Jackson County, Oregon. Urbanization, residential and industrial development, road construction and maintenance, livestock grazing, agricultural development, unauthorized off-road vehicle use, and changes in water usage have contributed to the decline of these plants and their habitat. Cook's lomatium sites to the west in Josephine County are also threatened by habitat alteration associated with gold mining and logging, as well as by non-native plants moving into the habitat because of fire suppression.

Biologists have identified 13 populations of Cook's lomatium and 10 populations of large-flowered woolly meadowfoam in the Agate Desert. Several lomatium populations grow on Bureau of Land Management lands, but the meadowfoam grows mostly on private property. Large populations of meadowfoam grow on land owned by The Nature Conservancy, which manages its land to benefit native species.

Biologists have discovered the vernal pool fairy shrimp *(Branchinecta lynchi)*, a small freshwater crustacean already listed as threatened, in some of the vernal pools that are home to the plants. Local government agencies and citizens in southwest Oregon are exploring regional planning options that could lead to the preservation of some vernal pools.

Two Southwestern Plants On April 12, the Service proposed to list two plant species native to the southwestern Utah/northeastern Arizona border area as endangered. The Holmgren milk-vetch *(Astragalus holmgreniorum)* is restricted to Washington County, Utah, and an adjacent part of Mojave County, Arizona. The Shivwits milk-vetch *(Astragalas ampullariodes)* occurs only in Washington County. Both plants are herbaceous perennials in the pea family (Fabaceae).

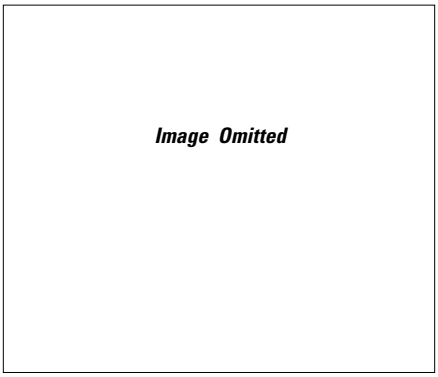
The numbers of both plants are rapidly decreasing due primarily to rapid urban expansion and population growth in the St. George, Utah, area. Much of the plants' habitat has been destroyed or degraded by the construction of new roads, power lines, and other development. Off-road recreational vehicle use, the spread of noxious weeds, overgrazing, and mineral development also threaten the plants' survival.

The Holmgren milk-vetch grows low to the ground, spreading in a circle of compound leaves, each with tiny oval-shaped leaflets. Found in shallow, sparsely vegetated soil, it produces small purple flowers in the spring and pods up to 2 inches (5 cm) long. The Shivwits milk-vetch, by contrast, grows up 20 (50 cm) inches tall, with flowering stems

that reach 40 inches (1 meter) in height. This plant, found only in clay soils, sports large leaflets and numerous cream-colored flowers. Unfortunately, it is palatable to most wild and domestic grazing animals.

Vermilion Darter *(Etheostoma chermocki)* The small, brilliantly colored vermilion darter, a fish found only in a single tributary in Alabama, is nearing extinction because of habitat destruction and a decline in water quality. As a result, the Service proposed on April 18 to list this native species as endangered.

The vermilion darter occurs only in the Turkey Creek drainage, a tributary of the Locust Fork of the Black Warrior River in Jefferson County. It needs free-flowing streams with clear rock surfaces to survive and reproduce. Vermilion darters face many threats, including earthen dams and impoundments that have altered stream dynamics and reduced the species' range significantly, excessive sedimentation that has made its tributary unsuitable for feeding and reproduction, and other pollutants, such as excess nutrients, pesticides and other agricultural runoff, that wash into the Turkey Creek drainage.



Vermillion darters
Illustrations © Joe Tomelleri

A local conservation group, the Society to Advance the Resources of Turkey Creek (START), recently received funding through the Service's Partners for Fish and Wildlife Program to minimize non-point source pollution of Turkey Creek. The Jefferson County Commission and START also have worked together to plan a nature preserve encompassing approximately 730 acres (295 ha) of the watershed. In addition, the Service has worked with the Alabama River Alliance and Alabama Environmental Council to promote watershed stewardship within Turkey Creek.

White Abalone *(Haliotis sorenseni)* On May 5, NMFS (which has ESA jurisdiction for most marine species) proposed to list the white abalone, a marine gastropod native to the waters off California and Baja California, Mexico, as endangered. Excessive take for commercial and recreational purposes has seriously depleted the white abalone throughout its range. Low population density due to overexploitation has reduced the species' reproductive success, thus exacerbating the decline. NMFS does not believe that predation by southern sea otters *(Enhydra lutris nereis)* has been a significant factor.

In 1996, the California Fish and Game Commission closed the white abalone fishery in the United States to protect the surviving adults, but it is unknown whether or not Mexico has limited or closed the fishery along the Baja Peninsula. A consortium of scientists, fishing interests, conservation organizations, government agencies, and mariculturists have joined in an effort to restore white abalone populations. Its activities will likely include collecting broodstock for propagation and establishing refugia for outplanted stocks.

Final Rules

Alabama Sturgeon *(Scaphirhynchus suttkusi)* The Service published a final rule on May 5 to list the Alabama sturgeon, a rare fish of prehistoric origins, as an endangered species. The decision was based on the species' small population size and inability to sustain a viable population. The Alabama sturgeon has disappeared from approximately 85 percent of its historic range in the Mobile River basin of Alabama and Mississippi. Only 5 have been captured in the last 4 years despite intensive efforts by federal and state biologists. This species was once so abundant it was caught and sold commercially. Biologists attribute its decline to over-fishing, loss and fragmentation of its habitat due to navigation-related development, and a degradation of water quality.

Four listed aquatic species share the Alabama sturgeon's habitat and negative economic impacts have not occurred due to their protection. Current activities, such as navigation channel dredging, hydroelectric power production, agriculture, and silviculture, will not be stopped by the listing of the sturgeon.

O'ahu 'Elepaio *(Chasiempis sandwichensis ibidis)* This songbird endemic to the Hawaiian island of O'ahu was listed on April 18 as endangered. Only seven populations totaling 1,500 birds are thought to remain on the island. The O'ahu 'elepaio was once widespread in forested areas throughout the island at all elevations. Currently, however, it is found only in mid-elevation forests in portions of the Ko'olau and Wai'anae mountains, where it is thought to occupy less than four percent of its original range.

The primary threats to the O'ahu 'elepaio are introduced diseases, including avian pox and malaria, and predation by non-native mammals, especially rats. Other known threats include storms with high winds that destroy nests, and habitat degradation and loss caused by human impacts and feral pigs.

Santa Ana Sucker *(Catostomus santaanae)* The Santa Ana sucker, once one of the most common fish in southern California, was listed as threatened on April 12. This fish historically inhabited small, shallow streams and tributaries throughout the Los Angeles basin. It is now restricted to small reaches of Big Tujunga Creek (a tributary of the Los Angeles River), the headwaters of the San Gabriel River, and the Santa Ana River in Los Angeles, Orange, Riverside, and San Bernardino counties. The Santa Clara River population that exists in portions of Los Angeles and Ventura counties was not listed because biologists believe it is an introduced population.

Biologists considered the sucker a common fish only 30 years ago, but it has experienced a sharp decline and now is absent from 75 percent of its historic range. Because the species reproduces abundantly and tolerates a broad range of habitats, its decline is an indication of how badly the streams and tributaries of the Los Angeles Basin have been degraded from their historical conditions.

LISTING ACTIONS

Threats to the species include water diversions, channelization and concrete lining of streams, erosion, pollution, recreational gold-mining with suction dredges, and the introduction of non-native species that prey upon the fish or compete with it for food or other resources.

All of the streams known to support the Santa Ana sucker have dams that isolate and fragment the remaining populations. Reservoirs have provided habitat for recently introduced non-native fishes that prey on and compete with Santa Ana suckers. Approximately 15 percent of the current range of the Santa Ana sucker is on U.S. Forest Service lands, including small portions within the San Gabriel Wilderness Area and the Sheep Mountain Wilderness Area of Angeles National Forest.

Northern Idaho Ground Squirrel *(Spermophilus brunneus brunneus)* Found only in Idaho, this animal has the smallest geographic range of any squirrel species and one of the smallest ranges of all North American mainland mammals. Its entire range covers an area about 18 by 20 miles (29 by 32 kilometers) on public and private lands north of Council, Idaho, although historically the range may have been much larger.

USFWS Snake River Basin Office photo

In recent years, habitat loss has caused a sharp population decline in northern Idaho ground squirrels. Fire suppression has allowed forests to encroach into the meadows where the species lives. Other threats include land conversion for agricultural and residential development and loss of open corridors between remaining populations.

The northern Idaho ground squirrel lives in dry, rocky meadows surrounded by forests of ponderosa pine or Douglas fir. It eats mainly grass seeds and other green leafy vegetation. The squirrels need large quantities of these food sources to store body energy for the 8 months they spends dormant underground from August through March.

As recently as 1985, biologists estimated there were 5,000 northern Idaho ground squirrels in Adams and Valley counties. By 1998, fewer than 1,000 squirrels were found on private property, lands administered by the State of Idaho, and the Payette National Forest. Population sites range from 3 acres to 40 acres (1.2 to 16 ha).

The Payette National Forest signed a conservation agreement with the Fish and Wildlife Service in 1996 to protect and enhance habitat for the species. The Forest Service is taking action to improve squirrel habitat, including thinning stands of timber to open more meadow habitat and controlled burning of shrubby meadows to create additional grassland and leafy vegetation.

A major portion of the northern Idaho ground squirrel population occurs on a single ranch. The owner of the ranch has been cooperating with the Service in efforts to study the squirrels and relocate them to Forest Service land.

Critical Habitat for Johnson's Seagrass *(Halophila johnsonii)* A marine plant classified as threatened, Johnson's seagrass grows along the east coast of Florida in scattered locations from Sebastian Inlet to Biscayne Bay. On April 25, NMFS designated 10 areas within this range as critical habitat (see the April 25 *Federal Register* for details) for the species. This designation alerts federal agencies to consult with NMFS to avoid any actions that are likely to adversely modify the critical habitat.

ON THE WEB

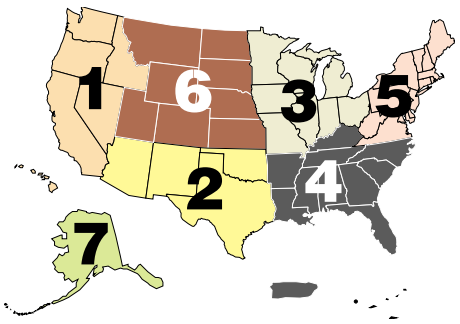
For more information on our Habitat Conservation Plan program, please visit our website. Just go to the Fish and Wildlife Service's Endangered Species Homepage (**http://endangered.fws.gov**) and click on the button at the left marked "HCPs." At this website, you can examine the regulations and policies shaping the HCP approach to reducing the affects of the Endangered Species Act while addressing the habitat needs of listed species.

Among other topics, the site explains how and why HCPs are developed, the issuance of Incidental Take Permits, and the "No Surprises" policy. "The Quiet Revolution," a 1997 publication posted on the website, features examples of HCPs throughout the nation. A 1995 article first published in the *Endangered Species Bulletin*, "The Nation's First Multi-species HCP for a Forested Landscape," illustrates an example from the state of Washington of the Service's trend towards landscape-scale plans that address the habitat needs of a number of listed and candidate species.

For details on how to develop an HCP, you can download the Habitat Conservation Planning Handbook (and its recent addendum), which was published jointly by the Fish and Wildlife Service and the National Marine Fisheries Service.

As mentioned on page 13, additional information on Wisconsin's statewide HCP is available at this website:
http://midwest.fws.gov/eco_serv/endangrd/insects/kbbhcp.html.

Region 1 has its own HCP website, containing information on: 1) the International Paper HCP in Washington, 2) the Washington Department of Fish and Wildlife's Hydraulic Project Approval Project (relating to reviews of activities that may affect state waters), and 3) a log showing the status of the numerous HCPs being developed or implemented in western Washington. This site can be found at:
http://pacific.fws.gov/hcp/



Fish and Wildlife Service regional endangered species staffers have reported the following news:

Region 1

Aleutian Canada Goose *(Branta canadensis leupareia)* An interesting development at Humboldt Bay (California) NWR may help in planning future habitat management. More Aleutian Canada geese are using the refuges's Salmon Creek Unit than at any time since the Fish and Wildlife Service acquired it in 1988. This may be due to the fact that this is the first time in recent years there has been no winter/spring grazing on the unit. The numbers of Aleutians rose from 700 in late January to 1,800 by mid-February, and to a mid-summer total of approximately 3,000. Along with the lack of disturbance, an additional benefit from no grazing was the fact that the refuge could hold on to more water than ever before. The grazing permit has been retired but the previous permit holder is being allowed to make hay on the land in order to help manage the growth of non-native plants.

Aleutian Canada geese
Photo by George Gee

Southwestern Willow Flycatcher *(Epiodomax trailii extimus)* Surveys and banding studies by Ash Meadows National Wildlife Refuge (NWR) biologist David St. George and staff from the U.S. Geological Survey's Biological Research Division (BRD) and Nevada Division of Wildlife have documented the presence of southwestern willow flycatchers at Ash Meadows since 1993. Recent DNA analysis by the BRD has separated these breeding pairs from the two other subspecies known to occur in Nevada.

Some exceptional information on southwestern willow flycatcher seasonal migrations has also turned up. A male banded at Ash Meadows in July 1998 was subsequently recaptured and color banded in San Jose, Costa Rica, in January 1999. He returned to breed at Ash Meadows in June 1999 but was not observed there this summer. Out of four southwestern willow flycatchers color-banded at Ash Meadows in July 1998, only one was observed at the refuge in 2000.

Public Outreach The fourth "Living With Carnivores" workshop made it to the Spokane REI (Recreational Equipment, Inc.) store on May 25, when more than 50 people participated in a 2-hour educational session. Five workshops were held across Washington in May and June to help residents understand how to avoid conflicts with grizzly bears *(Ursus arctos)*, black bears *(Ursus americanus)*, gray wolves *(Canis lupus)*, cougars *(Felis concolor)*, and coyotes *(Canis latrans)*. The workshops are a cooperative effort of the Service's Western Washington Office, the Washington Department of Fish and Wildlife, Defenders of Wildlife, Wolfhaven International, U.S.D.A.'s Wildlife Services agency, Northwest Ecosystem Alliance, Insight Wildlife Management, and CounterAssault Bear Deterrent Spray. There were slide show presentations on each of the carnivores followed by a lively question-and-answer session. The workshop was well received and was repeated

Grizzly bear
Corel Corp. photo

in Bellingham on June 22. A private donor from Bellingham, Washington, contributed $1,000 for the costs of conducting the June 22 workshop. A special fund was set up through Defenders of Wildlife to handle additional contributions. Other contributors have included the Seatac Rotary Club and REI Outfitters.

Reported by LaRee Brosseau of the Portland Regional Office.

Region 4

Wood Stork *(Mycteria americana)* The Service, in cooperation with several other state, federal, and private organizations, hopes to conduct surveys during the upcoming nesting season, beginning in October, to determine the current status of the endangered wood stork. At present, wood stork nesting colonies are found in South Carolina, Georgia and Florida. Post-breeding storks disperse as far north as North Carolina and as far west as Mississippi and Alabama.

In the early 1930s, wood stork populations totaled 75,000 birds. By the early 1980s, however, the stork's population had declined to 5,000 nesting pairs in 52 active colonies. The generally accepted explanation for the decline was the reduction in the food base available to support breeding colonies. This reduction was caused by a reduction in wetland habitat, accompanied by a change in hydroperiods resulting from the intensive water management in south Florida.

During the 1990s, the stork's total population increased to 6,000 nesting pairs in 59 active colonies in Florida, Georgia, and South Carolina. Historically, the largest populations have been in the Big Cypress National Preserve and the Everglades. Recently, the population appears to be growing in northern Florida, South Carolina, and Georgia. However, biologists are not yet certain whether the stork's population is actually increasing in the northern areas or is just moving north because of habitat changes in the Everglades. This will be an important determination to make before a proposal to reclassify the stork from endangered to threatened can be issued; the species' recovery plan stipulates that there must be at least 2,500 nesting pairs remaining within the species' historic south Florida area.

Reported by Bill Brooks of the Jacksonville, Florida, Field Office.

Puerto Rican Parrot *(Amazona vittata)* Ten captive-reared Puerto Rican parrots were released into the Caribbean National Forest on June 27, joining the 40 birds already in the wild. This release highlighted a 32-year cooperative effort between the Fish and Wildlife Service, U.S. Forest Service, and Puerto Rico Department of Natural and Environmental Resources to help save the parrot, one of the most endangered birds in the U.S., from extinction. Two aviaries sustain about 100 parrots to provide stock for future releases. The June 27 release included a formal ceremony and provided opportunities for media coverage.

Puerto Rican parrots
Photo by N. Snyder

Nine of the 10 released parrots were still alive and healthy as of early August and were adapting to their new environment. One bird was lost on July 1; its cause of death remains unknown. The birds are no longer using supplemental feeding, and they all survived an attack near the release site by a red-tailed hawk *(Buteo jamaicensis)* on July 19.

Reported by Elsie Davis of the Atlanta Regional Office.

Region 5

Corel Corp. photo

Bald Eagle (*Haliaeetus leucocephalus*) Two bald eagle chicks grew rapidly in a wild nest located on an island in the Connecticut River in western Massachusetts. What made this nest unique was the placement of a video camera above the nest that transmitted images to a nearby mainland receiver. Residents in the immediate area had access to the video signal via their local cable TV network, while folks around the world checked on the eagles' progress via the internet. Single video frames were captured by computer at the Silvio Conte NWR office and transmitted to offices of Northeast Utilities. The company's webmasters posted the images on the company's web page and refreshed them every 5 minutes during daylight hours. The web site has been receiving thousands of visits daily. Check out this fascinating wildlife success story by logging on to www.MassWildlife.org and clicking on the "eagle cam 2000" box, or go directly to www.nu.com and click on "Eagles Raising Two Chicks."

Plymouth redbelly turtle
Photo by T. E. Graham

Plymouth Redbelly Turtle (*Pseudemys rubriventris bangsi*) More than 120 endangered Plymouth redbelly turtles were released in early June as part of an intensive recovery project. The turtles were originally collected as quarter-sized hatchlings and distributed to museums, science centers, aquariums, and schools across the state where they were "headstarted" over the winter. Headstarting involves feeding and maintaining the turtles in warm waters to accelerate their growth at a time of year when they would normally be inactive. The young turtles benefit by avoiding predation when they emerge from their nest in the fall, and they are less vulnerable to predation in the spring because of their larger size. To date, more than 220 redbelly hatchlings have been headstarted and returned to their natural habitats in the ponds and rivers of Plymouth County. The headstarting effort is designed to bolster the redbelly turtle population, currently estimated at 300 adults, and to serve as an environmental education tool for the participating institutions, schools, and organizations.

Reported by Mark W. Clough of the Service's Cortland, New York, Field Office.

BOX SCORE

Listings and Recovery Plans as of August 31, 2000

GROUP	ENDANGERED U.S.	ENDANGERED FOREIGN	THREATENED U.S.	THREATENED FOREIGN	TOTAL LISTINGS	U.S. SPECIES W/ PLANS**
MAMMALS	63	252	9	16	340	47
BIRDS	78	175	15	6	274	76
REPTILES	14	64	22	15	115	30
AMPHIBIANS	10	8	8	1	27	12
FISHES	69	11	44	0	124	90
SNAILS	20	1	11	0	32	20
CLAMS	61	2	8	0	71	45
CRUSTACEANS	18	0	3	0	21	12
INSECTS	30	4	9	0	43	28
ARACHNIDS	6	0	0	0	6	5
ANIMAL SUBTOTAL	369	517	129	38	1,053	365
FLOWERING PLANTS	565	1	139	0	705	528
CONIFERS	2	0	1	2	5	2
FERNS AND OTHERS	26	0	2	0	28	28
PLANT SUBTOTAL	593	1	142	2	738	558
GRAND TOTAL	962	518	271	40	1,791*	923

TOTAL U.S. ENDANGERED: 962 (369 animals, 593 plants)
TOTAL U.S. THREATENED: 271 (129 animals, 142 plants)
TOTAL U.S. LISTED: 1,233 (498 animals***, 735 plants)

*Separate populations of a species listed both as Endangered and Threatened are tallied once, for the endangered population only. Those species are the argali, chimpanzee, leopard, Stellar sea lion, gray wolf, piping plover, roseate tern, green sea turtle, saltwater crocodile, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

**There are 530 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

***Nine animal species have dual status in the U.S.

ENDANGERED Species BULLETIN

U.S. Department of the Interior
Fish and Wildlife Service
Washington, D.C. 20240